Acoustic Igniter, Phase II

Completed Technology Project (2009 - 2011)

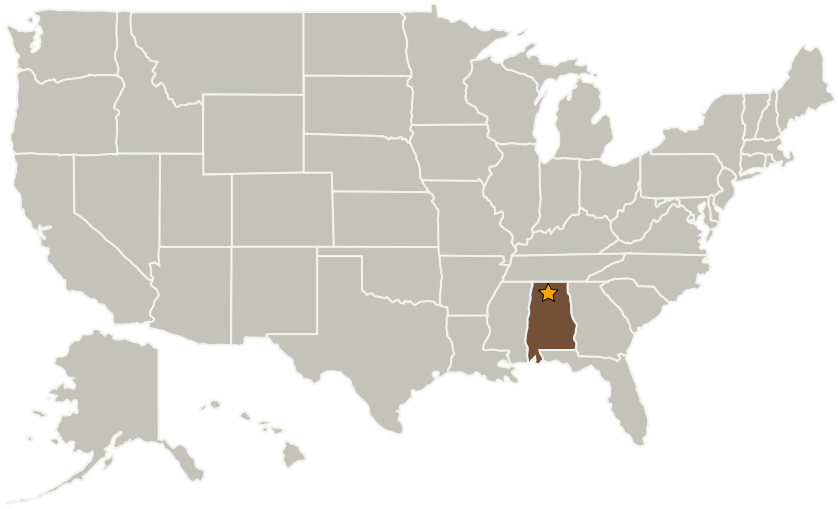
Project Introduction

An acoustic igniter eliminates the need to use electrical energy to drive spark systems to initiate combustion in liquid-propellant rockets. It does not involve the use of catalysts (which have a limited life), it does not exhibit typical wear and tear as seen in spark and catalytic igniters, and it is simple in design with no moving parts. Orion's proposed Acoustic Igniter is expected to offer a long-life, highly reliable ignition system that does not require high-voltage electrical connections. It is less complex to operate and simpler than a traditional ignition system. Orion's primary technical objective is to produce an acoustic igniter design that will ignite combustion of common liquid rocket fuel and oxidizer combinations such as gaseous oxygen and kerosene, and oxygen/methane. During Phase 1, we analyzed the operational issues that inhibit acoustic igniter performance. Based on these results, Orion will built a prototype unit, tested it, and evaluated its performance. This work established a basis for the follow-on Phase 2 effort to refine the design and upgrade the technology level of the acoustic igniter.

Anticipated Benefits

Potential NASA Commercial Applications: This system could be utilized in the commercial space sector in the small-sat or nano-sat arena. The simplicity, low weight and low cost are ideal for these commercial applications. In our program we intend to test the system in conjunction with a commercial thruster program which we are involved in to demonstrate this application

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Orion Propulsion, Inc.	Supporting Organization	Industry	Huntsville, Alabama

Primary U.S. Work Locations
Alabama

Project Transitions

September 2009: Project Start

March 2011: Closed out

Closeout Summary: Acoustic Igniter, Phase II Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

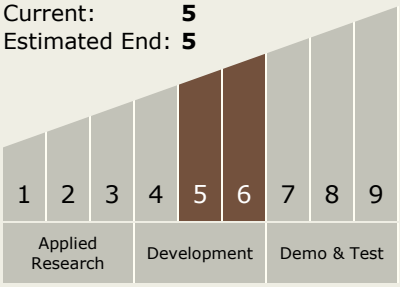
Carlos Torrez

Principal Investigator:

Timothy L Pickens

Technology Maturity (TRL)

Start: **6**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables